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PATENT APPLICATION OF

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ENTITLED

**DOOR OF A MOTOR VEHICLE WITH A SLIDING
GLASS PANEL, AND UPPER KIT FOR DOOR,
CORRESPONDING METHOD OF MANUFACTURING AND
VEHICLE**

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FIELD OF THE INVENTION

The field of the invention is that of the making of openings in vehicle doors. More precisely, the invention relates to the sealing devices of an opening made in the door of a motor vehicle and comprising a movable part according to an essentially vertical direction, likely to close or free an opening.

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BACKGROUND OF THE INVENTION

The invention particularly applies to side doors of a motor vehicle, and can also apply to back doors or to rear hatches.

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Classically, to seal the opening of a vehicle, whether that be a car, a commercial vehicle, a lorry, a bus or a train carriage, a window is fitted, held in place by a frame. The latter has an internal part and an external part, which simultaneously press against the edges of the window, with sealing trimmings.

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The most commonly known technique for opening and closing windows is to render the latter vertically movable within its own plane, in making it enter or exit its shell or its side door trimmings.

Today, this technique is much used and

automation solutions are known. The fitting of cars with electric windows is now commonplace.

At the same time, another technique was proposed by the Assignee of the present application. This 5 technique is notably described in the documents of patents EP-0 778 168 and EP-0 857 844.

Thanks to this technique, "flush openings" are achieved which have, aesthetically speaking, as seen from the outside, a smooth aspect, being flush as no 10 frame is needed.

According to the prior technique proposed by the Assignee, the "flush openings" comprise a fixed unit and a movable part, the fixed unit being intended to be fitted into the especially designed well on the 15 body of the vehicle.

Now, the openings made in the doors have relatively restricted dimensions so it is not opportune to greatly reduce them in introducing a fixed unit according to the prior technique.

20 Nevertheless, it is desirable to be able to fit certain vehicles, in particular top-of-the-range vehicles such as people carriers, with flush openings, the prior flush openings not being modifiable to doors of such vehicles.

25 The present invention proposes a solution that allows the closing of an opening made in the door of a vehicle with a flush panel fitted with a vertically movable part for ventilation purposes.

The invention also has the objective of

supplying such a sealing device which allows to resolve the particular problems associated with the structure of a door.

Furthermore, another objective of the invention 5 is to supply such a sealing device to ensure the watertightness in a reliable and durable manner.

The invention also has the objective of supplying such a sealing device which avoids the introduction of harmful and undesirable particles 10 between the movable panel and the means of associated watertightness.

The invention also has the objective of supplying such a sealing device which allows the making of doors which have new characteristics, 15 notably in terms of aesthetics and ergonomics.

Another objective of the invention is to supply such a sealing device which is of simple design and easy to implement.

The invention has yet another objective, 20 according to certain embodiments, of supplying such a door which allows simple integration and aesthetics of a concealing device, securing of the sealing device against possible attempted intrusions, etc.

Yet another objective of the invention is to 25 supply a method of manufacturing the door of a motor vehicle, that is simple and quick to implement.

SUMMARY OF THE INVENTION

These objectives along with others, which will be described later, are achieved thanks to the

invention whose object is the door of a motor vehicle, comprising a body shell and at least one movable glass panel, likely to slide at least partially on the inside of the said shell between a 5 sealing position and at least one open position, the door comprising at least one strut bearing a watertight joint against which the side of the said movable glass panel turned towards the inside of the vehicle leans, in the said sealing position, each of 10 the said struts bearing at least one guide track allowing to slightly distance the said movable glass panel from the said watertight joint, in a sliding position in which the said movable panel can slide without damaging the said watertight joint, and to 15 return the said movable glass panel and the said watertight joint to lean against each other, in the said sealing position.

The watertightness of the device is ensured when the movable panel is in the sealing position, whilst 20 avoiding, or at least limiting, the harmful or undesirable effects due to the interaction between the movable panel and watertight joint.

Indeed, by distancing the movable panel from the joint while the panel slides vertically, the 25 invention avoids:

premature wear and tear of the watertight joint likely to be provoked by the successive rubbing of the panel against the joint,

noise (such as squeaking), once again due to the

rubbing of the panel against the joint, such noises can increase with the structural adjustments to the joint due to variations in temperature, humidity or due to sun rays, wear and tear, etc.

5 The use of tracks allows this function to be ensured in a simple and efficient manner.

According to an advantageous solution, in the said sliding position, the said glass panel is in a sliding plane parallel to a sealing plane occupied by 10 the said glass panel in the sealing position.

According to a preferred solution, each of the said struts bears at least two guide tracks, respectively next to the upper and lower parts of the said strut.

15 According to an advantageous solution, at least one of the said struts enters into the said shell.

Preferably, the said strut(s) are designed so as only to come into contact with the side of the said movable glass panel turned towards the inside of the 20 vehicle, so as to have a flush aspect in the said sealing position.

Thus a door is obtained comprising a window sliding in a vertical direction and that has a flush aspect as well as an aerodynamic aspect, compatible 25 with the other "flush openings" proposed by the present Assignee.

Advantageously, the said struts are connected at their upper parts by a cross member, to create an interior frame, the said watertight joint

substantially extending along the entire length of the said frame.

Thus, the invention supplies a sealing device according to which it has not been planned to fit a 5 fixed unit defining a sliding plane for the movable panel as is the case with the prior technique.

On the contrary, the device exploits the strut(s) or the frame, classically present on a door, as a means of support for the panel when the latter 10 is in the sealing position. In other words, in the sealing position, the movable panel positions itself in front by leaning against the strut(s) or the frame, the joint ensuring the watertightness of the thus created sealing device.

15 Furthermore, the invention allows the suppression of the frame moldings classically added to the side doors.

According to an advantageous solution, the said movable panel is mounted to at least one foot whose 20 displacement is guided via a guide rail and the said guide track(s).

Advantageously, the door comprises a motorized means of driving the said movable panel, ensuring the said sliding.

25 According to another embodiment, the means of driving can be manual.

According to a first variant, the said means of driving are mounted into a single rail fitted to the inside of the said shell, and/or into at least one of

the said struts.

In this case and according to a first approach, the said means of driving advantageously act on at least one of the said feet.

5 According to another characteristic, the door further comprises at least one fixed panel, fitted into the said sealing plane.

According to a particular embodiment, the door comprises at least a windscreen wiper blade intended 10 to be moved across the said panel in the sealing position, means of guiding being planned for on the said strut(s) so as to allow for linear movement of the said blades.

According to another advantageous aspect of the 15 invention, the door can support a blind.

In this manner, the fitting ranges are considerably simplified, and the adjustments necessary for the correct operating of the blind are, at least to a large extent, avoided in comparison 20 with classical blinds fitted to a trimming, itself fitted to the structure of the door.

According to a preferred solution, at least one of the said struts has means of guiding the sliding of the pull bar of the said blind.

25 According to another characteristic, the door comprises burglarproof means acting upon the said movable panel in the sealing position.

In this case, the said burglar-proof means preferably comprise at least a lock intended to

operate with a complementarily shaped housing set into one of the said struts or into the said frame, with the aim of providing a burglar-proof position of the said panel in the sealing position, according to 5 which the panel can not be pulled towards the exterior of the vehicle.

According to an advantageous solution, the said lock(s) are designed to slot into a part that protrudes the said struts or the said frame.

10 According to yet another characteristic, the door comprises means of adjusting the said sealing position of the said movable panel and/or of the said burglarproof means.

Thus, the position of the movable panel can be 15 quickly and easily adjusted in relation to its surroundings (frame, body, rear quarter light, etc.).

In this case, the said means of adjusting are advantageously supported by the said movable panel or by an integral part of the latter, and are intended 20 to operate with the said frame so as to adjust the said sealing position of the said movable panel.

According to a preferred solution, the said means of adjusting comprise two screws, acting on the said sealing position along the width of the said 25 movable panel, the other acting on the said sealing position along the height of the said movable panel.

According to an advantageous solution, the said strut(s) and/or the said cross member are made via extrusion.

Thus, the struts can be designed and made so that they integrate all the operating parts allowing the implementation of the aforementioned characteristics.

5 The invention also relates to an upper unit of the door of a motor vehicle, creating a kit ready to be mounted to a lower shell of the door of a motor vehicle, and comprising at least one movable glass panel, likely to slide at least partially on the
10 inside of the said shell between a sealing position and at least one open position, the door comprises at least one strut bearing a watertight joint against which the side of the said movable glass panel turned towards the inside of the vehicle leans, in the said
15 sealing position, each of the said struts bearing at least one guide track allowing to slightly distance the said movable glass panel from the said watertight joint, in a sliding position in which the said movable panel can slide without damaging the said
20 watertight joint, and to return the said movable glass panel and the said watertight joint to lean against each other, in the said sealing position.

According to an advantageous solution, this upper unit comprises means of stiffening.

25 In this case, the means of stiffening preferably comprise at least one lower cross member linking the lower part to the said struts.

Advantageously, the said lower cross member has means of implementation and/or support of the said

struts.

Preferably, the said means of implementation and/or support comprise at least one coupling fitted onto one of the ends of the said lower cross member
5 and intended to create a housing for one of the said struts.

Advantageously, the said guide rails have at least one mounting bracket on the strut and/or the cross member.

10 The assembling of the upper unit which has just been described can be obtained in a particularly simple and efficient manner: the struts are fixed to the cross member, then the guide rails are fixed to the struts. As this will be seen later, there remains
15 the interlocking of the movable glass panel with the driving feet, for example via simple clips. Such an assembly on a production line is largely simplified compared to classical assembly of traditional doors.

Such a layout is also particularly advantageous
20 during future maintenance work, the disassembling of the unit can be obtained by carrying out a limited number of simple actions in the reverse order of assembly.

According to another characteristic, this upper
25 unit comprises means of motorization.

In this case, the means of motorization are preferably fitted to the cross member, and advantageously comprise:

at least one gear motor;

at least one coil coupled to the said gear motor;

at least one multi-stranded cable;

at least one protective sheath of the said 5 cable(s);

means of placing under tension the said cable(s).

Of course, other embodiments are conceivable whilst remaining in the scope of the invention, 10 notably in planning for means of motorization implementing rack type cables.

The assembling (or pre-assembling) of the means of motorization with the cross member allow to conceive the manufacturing and assembly (on the cross 15 member) of the means of motorization in a manner independent of the door, even independent of the entire upper unit. The making of this part comprising the means of motorization can consequently be subcontracted and delivered in a ready-to-be- 20 assembled state.

Preferably, the upper unit also comprises means of motorization.

According to a preferred solution, at least one of the said struts has an extension intended to enter 25 into the said shell so as to allow the interlocking of the said shell with the said unit.

Advantageously, the upper unit has a blind.

Thus, a complete upper unit is delivered, pre-equipment and set (integrating the opening, the means

of motorization, a blind, means of watertightness, etc.), which considerably reduces the problems notably connected with the logistic and/or separate delivery of all the units in question.

5 The invention also relates to a motor vehicle fitted with an aforementioned door.

The invention yet again relates to a method of manufacturing the door of a motor vehicle, characterized in that it comprises the follow stages:

10 manufacture of a lower shell of the door;
assembly of an upper unit of the door as previously described;
assembly of the said lower shell and of the said upper unit.

15 In this way, the different means comprising the upper unit can be assembled and pre-set before being fixed to the shell of the door.

The assembly of the upper unit to the shell is a simple operation: the method of manufacturing a door 20 according to the invention therefore allows a motor vehicle constructor to apprehend considerable time saving, the latter only having to make the shell and carry out the assembly with the pre-set unit, ready for use.

25 Preferably, the said manufacturing stage of the said upper unit comprises a shaping stage of at least one of the said struts so as to fit to it means of guiding, implementation and/or maintenance of the said struts in the said shell.

According to an advantageous solution, the said manufacturing stage of the said upper unit comprises an assembly stage, to the said strut(s), of a watertight joint against which the side of the said 5 movable glass panel turned towards the inside of the vehicle leans, in the said sealing position, and an assembly stage of means for slightly distancing the said movable glass panel from the said watertight joint one from the other, in a sliding position in 10 which the said movable panel can slide without damaging the said watertight joint, and for returning the said movable glass panel and the said watertight joint to lean against each other, in the said sealing position.

15 BRIEF DESCRIPTION OF THE DRAWINGS

Other characteristics and advantages of the invention will become clearer upon reading the following description of a preferred embodiment of the invention, given by way of non-restrictive 20 examples and made in reference to the annexed figures in which:

figure 1 is an exploded view of a door according to the invention;

25 figure 2 is a detailed view of the means of guiding a sealing device according to the invention;

figure 2a is a skeletal representation of the means of guiding a sealing device according to the invention;

figure 3 is a view of an upper unit intended to

be fitted to the shell of the door;

figure 4 is a view of an upper unit of the door according to the invention, fitted with a blind;

figures 5 and 6 are detailed views of the 5 assembly of a blind on an upper unit of the door according to the invention;

figure 7 is another view of the upper unit illustrated in figure 4, the blind being in the closed position;

10 figures 8 to 10 are respective cross-section views of the cross member, the central strut and the front strut of the upper unit illustrated in figure 4;

15 figures 11 and 12 are views of the means of locking/unlocking the movable panel of a door according to the invention;

figures 13a and 13b are views of two movable panels, respectively in the rectangular and trapezoidal shape, allowing to illustrate the 20 position of the means of locking/unlocking;

figure 14 is a front elevation of a rear hatch according to the principle of the invention, pre-equipped with a windscreen wiper device;

25 figures 15 and 16 are views of a preferred embodiment of an upper unit intended to be added to a shell of the door, this unit being respectively in a disassembled state and in an assembled state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In reference to figure 1, a door comprises,

according to this embodiment of the invention:

a movable panel 1 according to an essentially vertical direction along the central rail 22, driven between a sealing position and an open position via 5 means of motorized driving (of type push-pull cable for example) comprising a gear motor 21;

means of guiding (explained in greater detail later on) planned in the struts of frame 3 and intended to operate with the sliding feet 11 10 supported by the movable panel 1.

According to the object of the invention, the frame 3 is added and fixed to a shell of a side door of a vehicle, as illustrated in figure 3.

According to this embodiment, the frame 3 is 15 planned to support a fixed rear quarter light 4, independent of the sealing device according to the invention. This window 4 and, consequently, the part of the corresponding frame are entirely optional.

Advantageously, the rear quarter light 4 shares 20 one of the struts of the frame with the movable panel, and is mounted so as to present a flush aspect, the same as that of the movable panel.

According to a characteristic of the invention, a watertight joint 5 is added to the frame 3 so as to 25 extend along the entire length of the visible part of the frame once it has been assembled with the shell of the door.

In the sealing position, the movable panel 1 leans against this watertight joint 5 slightly

flattening it so as to provide an airtight seal on the device notably in relation to humidity and drafts.

As illustrated by figure 2, the feet 11 5 supported by the movable panel 1 are intended to slide on the rails 31 fitted to the struts of the frame 3.

According to the invention, the door comprises means of slightly distancing the movable glass panel 10 1 and the watertight joint 5 one from the other, in a sliding position into which the movable panel 1 can slide without damaging the watertight joint 5, and of returning the movable glass panel 1 and the watertight joint 5 to lean against each other, in a 15 sealing position.

According to this embodiment, these means are comprised of locking/unlocking displacement guide tracks 32 and 33, and intended to operate with the feet 11.

20 The movable panel 1 bears, next to each of its vertical edges, two feet 11, one next to the upper edge, and the other next to the lower edge. At the same time, two pairs of tracks 32 and 33 (respectively acting on the lowering and raising) are 25 planned for each strut of the frame 3, one pair next to the upper end of the corresponding strut, and the other next to its lower end.

Thus, whilst lowering (starting from a sealing position) the movable panel 1, the lower edge of the

feet 11 slide along the upper edge of the guide track 33, which provokes a difference in level from the movable panel in the direction indicated by the arrow F2 in figure 2. This displacement is also skeletally 5 illustrated in figure 2a.

The movable panel can then be lowered to a position limited by a stopper.

Inversely, during a raising of the movable panel 1 (the upper edge of the latter approximately reached 10 the upper edge of the frame 3), the upper edge of the feet 11 slide along the lower edge of the guide tracks 32, which provokes a displacement of the movable panel in the direction indicated by the arrow F1.

15 The highest position of the movable panel is moreover limited by a mechanical stopper.

The displacement in the direction indicated by the arrow F1 is planned so that the movable panel 1 leans against the watertight joint 5 to ensure a 20 tight seal, the direction indicated by the arrow F2 being planned so as to sufficiently distance the panel from the joint, until they are in a non-contact position.

The presence of pairs of feet such as previously 25 indicated and corresponding means of guiding, at the top and bottom of the struts of the frame, ensure a locking/unlocking displacement of the movable panel according to which the latter permanently remains substantially parallel to itself.

Furthermore, according to this embodiment, the movable panel is a tinted window allowing to hide, in the sealing position, the frame 3 and the watertight joint 5.

5 According to an advantageous characteristic of the invention, the sealing device can be fitted to a unit 7 (figure 3) ready to be assembled to a shell 6 of the door classically comprising an exterior panel, backing, different means of reinforcement and
10 opening/closing systems.

Such a unit 7 comprises:

a frame 3 of which at least one of the struts comprises means of guiding such as previously described;

15 a movable panel 1 bearing feet 11 intended to operate with the means of guiding of the frame.

This unit could in addition be pre-equipped with means of motorization.

These means of motorization can be of the
20 aforementioned type (central rail).

According to another conceivable embodiment, the unit 7 can be equipped with means of motorization also comprised of a gear motor and a push-pull cable driving system, the driving system being linked to
25 the feet supported by the panel. In this case, the driving means extend into the struts of the frame.

This second embodiment consequently allows the removal of the central rail 22, the assembly of the unit 7 to the shell thus being easier than in the

case of the first embodiment.

According to yet another embodiment illustrated in figures 4 and 5, the upper unit 7 is comprised of a frame 3, a movable glass panel 1, a watertight 5 joint 5 and a lower part 71 which will be described in fuller detail later on.

According to this embodiment, this lower part 71 of the unit 7 comprises two guide rails 711 mounted onto the ends of one cross member 37 via mounting 10 brackets 7111.

As indicated in figures 15 and 16, the cross member 37 has at each of its ends a coupling 371 creating a housing for a strut 35 of the frame. Figure 5 illustrates an upper unit 7 in an assembled 15 state and in which the struts 35 of the frame are slotted into the couplings 371 of the cross member 37, the rails 711 being in addition fixed to the struts 35 via mounting brackets 7112.

Lower part 71 exercises a stiffening function on 20 the upper unit 7. Indeed the cross member 37 links the struts 35 at their lower ends, this connection being furthermore strengthened by the rails 711 fixed (before assembling the lower part 71 of the frame 3) to the cross member on one hand and to the struts 35 25 on the other hand.

According to another characteristic, the cross member 37 has means of motorization comprising:

- a gear motor 21;
- a coil 211 coupled to the gear motor 21;

multi-stranded cables 212 connecting the coil 211 to the feet 11;

protective sheaths (not represented) of the cables 212;

5 means of placing the cables 212 under tension 213 (known to those skilled in the art).

The driving via the multi-stranded cables can be adjusted in other conceivable embodiments, notably by using rack type cables.

10 The method of manufacturing and assembling an upper unit comprises, according to the layout which has just been described, the following stages:

15 making of a lower part 71, comprising two lateral guiderails 711 linked via a cross member 37 bearing couplings 371 at its far ends;

assembling of this lower part with a frame 3, notably by slotting the struts 35 into the couplings 371 of the cross member 37 and via the fixing of the guide rails 711 with the struts 35.

20 As previously indicated, this lower part can be pre-equipped with means of motorization and driving, such as those previously indicated in the context of this embodiment. In this case, the mounting of the upper unit 7 comprises an assembling stage of the 25 movable glass panel with the feet of the drive system.

The unit 7 being pre-assembled, the manufacturing of the door is quickly and simply obtained by inserting the unit 7 into the shell 6,

between the external panel and the backing of the latter, and by interlocking the two elements by any appropriate means.

More precisely, the essential stages of the
5 method according to the invention are:

a first stage, according to which a shell 6 of the door is made, such a shell classically comprises an external panel, backing, different means of reinforcement, opening/closing systems;

10 a second stage, according to which an upper unit 7 of the door is made, such a unit comprises a frame 3 of which at least one of the struts comprises means of guiding a movable panel 1, these struts being intended to enter the shell 6 and to be fixed to it;

15 a third stage consisting of making the struts enter the upper unit 7 in the shell 6 and of assembling by any appropriate means (screwing, welding, etc.) the struts to the interior of the shell.

20 The order of the first two stages is given for information purposes only, these two stages being, in practice, carried out at the same time.

Furthermore, according to an advantageous characteristic, the door that has just been described
25 can be fitted with a blind 41 comprising a movable toile 411 between a folded position (figure 4) and a spread out position (figure 7).

Blind 41 is sized in such a way so as to conceal the entire opening of the door including the fixed

rear quarter light 4 (it can however be planned that, according to another conceivable embodiment, a specific blind be provided for the rear quarter light).

5 As illustrated by figures 4 to 6, the winding tube 412 of the blind 41 is fitted to the upper part of the frame 3 (it is however conceivable, according to another embodiment, that the winding tube is fitted to another part of the frame, in particular 10 its lower part or one of the struts).

In reference to figures 5 and 6, the pull bar 413 bears the sliding feet 4131 and 4132, guided along the central and front struts of the frame 3.

This aspect is illustrated in greater detail in 15 figures 9 and 10 which are respectively cross-section views of the central strut 34 and the strut 35 of the frame 3.

As previously indicated, these struts integrate a guiding rail 31 planned to operate with the feet 11 20 interlocked with the movable panel 1 with the aim of guiding the sliding of the latter.

Trimmings 342 and 352 are added to the frame 3 with the aim of notably hiding the rails 341 and 351 and of hindering any dirt from entering.

25 In addition, the strut 34 has another guide rail 341 intended to operate with the foot 4131 (of which one end enters the rail 341) supported by a pull bar 413.

In a similar manner, the strut 35 has a rail 351

intended to operate with the foot 4132 (of which one end enters the rail 341) supported by a pull bar 413.

In reference to figure 8 which is a cross-section view of the cross member 36 of the frame 3, 5 the winding tube 412 of the blind 41 is fitted next to the cross member 36.

Trimming 361, creating a box, is added to the cross member 36 so as to hide the winding tube 412 and to hinder any possible dirt from entering and 10 affecting its proper working.

This trimming 361 has a slot 3611 so that the toile 411 of the blind can pass through, this slot 3611 being sized to allow the pull bar 413 to enter the interior of the trimming in the folded position 15 of the toile 411.

According to this embodiment, the struts 34 and 35 of the cross member 36 bear in an embedment the joint 5 intended to ensure the watertightness of the sealing device when the movable panel 1 is in the 20 sealing position.

Furthermore, the door comprises, according to another advantageous aspect, burglarproof means acting upon the movable panel when the latter is in the sealing position.

25 This aspect is illustrated by figures 11 and 12.

In reference to figure 11, these burglar-proof means are comprised of a lock 12, made for example in metal covered in a TPE type material, fixed to the side of the movable panel turned towards the inside

of the vehicle. Several locks can of course to be planned for.

As illustrated in figure 12, this lock is intended, in the sealing position of the movable panel 1, to be embed into the housing of the frame defined by the part 362 protruding into the cross member 36.

Thus, once the panel is in the sealing position, it is impossible for someone to pull on the panel 1 so as to displace it towards the exterior of the vehicle, nor to lean down on it to displace it towards the interior.

Advantageously, a screw 121 goes through the lock 12 and is intended to operate with the part 362 of the cross member with the aim of, during the tightening or loosening of the screw 121, adjusting the sealing position of the movable panel 1.

To be specific, this screw 121 acts so as to adjust the sealing position of the mobile panel 1 in an upward direction. Another screw operating with another part of the frame can also be planned so as to adjust the sealing position of the movable panel in a lateral direction.

The lock that has just been described can be fitted to the upper edge 111 of the movable panel 1, in particular if the latter has a rectangular shape (figure 13a), or to its upper edge 111 and/or its sloping edge 112, in the case of a movable panel of trapezoidal shape (figure 13b).

In the case of a trapezoidal shaped panel, adjustment screws associated with a lock fitted next to the upper edge 111 of a part, and a lock fitted next to the sloping edge 112, allow the adjusting of 5 the sealing position of the movable panel as much in an upward direction as a lateral direction.

As previously indicated, the principle of the invention particularly applies to side doors, and also applies to back doors and rear hatches. Also, 10 according to a variant, the doors (or rear hatches), according to the invention, can be fitted with a linear windscreens wiper device.

Such an embodiment is illustrated in figure 14.

As shown in this figure, the struts of the door 15 integrate the means of guiding allowing linear displacement, according to a substantially vertical direction (such as indicated by the double arrow F3), the blade 50 having the aim of evacuating the water present on the window 1 (according to another 20 conceivable embodiment, the means of guiding can be planned to ensure a linear displacement according to a substantially horizontal direction).

These means of guiding are composed of a rail in which the feet supported by the blades are likely to 25 be displaced. This rail comprises:

two runners extending substantially along the entire height of the window 1, parallel to each other;

two offset tracks parallel between them and

linking the two runners, whilst sloping in relation to the latter.

Such a guide rail enables an operating cycle according to which the windscreen wiper is slid 5 across the surface of the window, and then distanced from it, slid in the opposite direction along the window (whilst being distanced from it), then brought into contact with the window, before being slid once again across the latter.

10 Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.

15